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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,666	01/16/2002	John C. Hardwick	03397-036001	1168

26171 7590 02/27/2007
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EXAMINER	
HARPER, V PAUL	
ART UNIT	PAPER NUMBER
2626	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/046,666	Applicant(s) HARDWICK, JOHN C.
	Examiner V. Paul Harper	Art Unit 2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a).. In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-77 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-77 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/21/06 have been fully considered but they are not persuasive.

2. Regarding the 101 rejections (and the Applicant's arguments), the Applicant has not addressed the lack of tangibility. The following is the summary of the logic used for the 101 rejection:

Q1—does the claim invention fall within one of the statutory classes? Yes, method claims.

Q2—does the claimed invention fall/cover/include a judicial exception? Yes, abstract idea – claims 1 and 38 are seemingly patentable method, however, they are in reality seeking patent protection for a mathematical algorithm in abstract as evidenced by the fact that the claims have to do with the algorithmic manipulation of data.

Once the answer of Q2 is a "yes", continue to ask the following:

1. practical application by physical transformation? No, there are no resulting real world outputs.

2. practical application that produces useful and tangible result? No, although there may be useful intermediate results, there are no useful <u>tangible results</u> claimed.

Conclusion – non statutory.

3. Applicant asserts on page 18:

> The rejection indicated that Griffin teaches computing first and second digital filters at Fig. 2 and col. 4, lines 38-65. However, that passage merely mentions that unvoiced frequency band components may be generated from a filter response to a random noise signal, where the filter has a magnitude of approximately the spectral envelope in unvoiced bands and approximately zero in voice bands. *The passage nowhere describes or suggests using the filter in conjunction with pulse locations.* (Italics added)

The Examiner notes that col. 4, lines 55-60, "include[s] bits representing fundamental frequency information, and the spectral envelope information" which is used to generate voiced information which is more than just generating a response from a random noise signal. Also, Griffin does not use the phrase "pulse locations" and in the rejection, Barnwell is included to support this teaching.

4. Applicant further asserts beginning on page 18:

> The final rejection also indicates that Griffin teaches the determining of spectral and voicing information for frequency band of a frame at the abstract and col. 5, lines 58-62, and that the determining of voicing information necessarily determines pulse excitation locations. This conclusion by the Examiner is not understood. Moreover, even assuming for the sake of argument that it is correct, it would not lead to the recited use of digital filter in conjunction with the pulse location since, as noted above, Griffin state that the filter response is to a random noise signal.

To clarify the connection between fundamental frequency and pulse locations, the introductory sections of Barnwell have been included. Starting with the third paragraph on page 5, Barnwell describes the relationship between fundamental frequency and pitch, and beginning with the last line on page 5, Barnwell describes how a train of pitch pulses can be used to excite a digital filter to produce a voiced signal

(see Fig. 1.2, Pulse Generator, Voiced, Linear Vocal Tract Filter). Also, as stated above, Griffin teaches that fundamental frequency information is used (not just random noise). With respect to Barnwell's Fig. 1.2, the Pulse Generator generates pulses corresponding to the Pitch Period Estimates (voiced speech), and the Noise Generator corresponds to the random noise signal (unvoiced speech). The Examiner notes that Barnwell is a laboratory textbook which is used for the instruction of undergraduates in speech coding, and thus this material would be extremely well-know in the art.

5. Applicant asserts on page 19:

> ... Applicant has reviewed Barnwell and does not see where Barnwell sets forth the noted illustration and, to the extent that the Examiner continues to maintain that such illustration may be found in Barnwell, applicant requests that the Examiner provide an explanation of where it can be found.

For example, in Figure 5.2, p. 88, pitch information is input to a pulse generator which for voiced signals excites a filter (linear predictor) which is configured with spectral information (LPC Coefficients).

6. Applicant asserts on page 19:

> As previously noted, applicant strongly disagrees. First, the passage of Barnwell identified in the rejection (pages 85-89) merely describes well know LPC techniques and in not way describes or suggest the recited producing of sets of first and second signal samples using the digital filter and the pulse location, or the recited combining of the first and second signal samples to produce digital speech samples. Accordingly, for at least these reasons, the rejection of claim 1 and its dependent claims should be withdrawn.

As stated in the rejection, Griffin teaches the generation of synthetic speech with the input of fundamental frequency and spectral (coefficient) information where a filter is defined by the coefficients used to program it (Fig. 2). Since each frame corresponds to spectral information, sequential frames will define sequential filters (hence a first and second filter). Barnwell further clarifies the connection between pulse locations (and fundamental frequency) and the excitation of a digital filter (Fig. 5.2, and previous arguments).

7. Applicant asserts on page 20, paragraph 2, that there is no motivation of combine.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Barnwell was included because it teaches well known techniques that can be used in data compression. Barnwell also clarifies the connection between the fundamental frequency and pulse locations and the programming of a fitter with spectral information (see rejection of claim 1, below).

8. Applicant asserts on page 20, ¶3 that Griffin and Barnwell do not describe the subject matter of claim 38. See the previous arguments.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. Claims 1-75 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1 and 38 preempt abstract ideas and do not appear to result in a practical application (i.e., produce a useful, concrete or tangible result; see "Interim Guidelines for Examination of Patent Applications for Paten Subject Matter Eligibility" pp. 1, 23, 58). In these cases, the end result is a combining of first signal samples with second signal samples, which is not useful, concrete, or tangible.

Claims 2-37 and 39-75 are rejected for failing to cure the deficiencies of the above rejected nonstatutory claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 16, 27, 28, 37-41, 43, 44, 59, 60, 62 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin et al. (U.S. Patent 5,701,390), hereinafter referred to as Griffin, in view of Barnwell et al. ("Speech Coding: A computer laboratory textbook," 1966, John Wiley & Sons, Inc.), hereinafter referred to as Barnwell.

Regarding **claim 1**, Griffin discloses a method for the synthesis of MBE-based coded speech using regenerated phase information. Griffin's method includes the following:

- dividing the speech model parameters into frames, wherein a frame of speech model parameters includes pitch information, voicing information determining the voicing state in one or more frequency regions, and spectral information (col. 3, lines 4-12; col. 9, lines 28-35);
- computing a first digital filter using a first frame of speech model parameters, wherein the frequency response of the first digital filter corresponds to the spectral information in frequency regions where the voicing state equals the selected voicing state (Fig. 2, col. 4, lines 38-65; digital filters are used to synthesize the speech, excited by the appropriate input [v/uv]); and col. 13, line 60 through col. 14, line 7);
- computing a second digital filter using a second frame of speech model parameters, wherein the frequency response of the second digital filter corresponds to

the spectral information in frequency regions where the voicing state equals the selected voicing state (Fig. 2, col. 4, lines 38-65; parameters from sequential packets are loaded creating different filters, which are excited according to voicing state; and col. 13, line 60 through col. 14, line 7, sequential packets can overlap).

- combining the first signal samples with the second signal samples to produce a set of digital speech samples corresponding to the selected voicing state (Fig. 2, Synthetic speech produced).

As stated above, Griffin teaches the use of multiple filters (with spectral and fundamental frequency information during the synthesis process [col. 4, lines 55-59] where it might be argued that the use of fundamental frequency information determines a set of pulse locations), but Griffin does not <u>specifically</u> teach the following:

- determining a set of pulse locations;
- producing a set of first signal samples from the first digital filter and the pulse locations;
- producing a set of second signal samples from the second digital filter and the pulse locations;

However, the examiner contends that these concepts were well known in the art, as taught by Barnwell.

In the same field of endeavor, Barnwell teaches speech coding where a filter is "programmed" with coefficients and excited with pulses (pp. 85-89, Fig. 5.2), where the pulses will necessarily have a separation (pitch period—location) and sequential sets of samples (from frames or subframes) will produce a signal.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Griffin by specifically providing the features, as taught by Barnwell, because it is well known in the art at the time of invention for the purpose of producing synthesized speech at a decoder using low bandwidth transmissions (Barnwell, p. 85, Introduction), and furthermore Barnwell illustrates (clarifies) the connection between the fundamental frequency (as taught by Griffin) and pulse locations as claimed when used to excite a filter (programmed with spectral information) during a voiced state. Barnwell also illustrates the sequential nature of the process: a first set of spectral coefficients program the first digital filter and when excited produce the first set of signal samples; the second set of spectral coefficients program the second filter and when excited produce the second set of signal samples, etc. These outputs are combined to produce the reconstituted digital signal.

Regarding **claim 2**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 1). In addition, Griffin teaches "wherein the frequency response of the first digital filter and the frequency response of the second digital filter are zero in frequency regions where the voicing state does not equal the selected voicing state" (col. 13, line 62 through col. 14, line 6).

Regarding **claim 3**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 2). In addition, Griffin teaches "wherein the spectral

information includes a set of spectral magnitudes representing the speech spectrum at integer multiples of a fundamental frequency" (col. 4, lines 55-61).

Regarding **claim 4**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 2). In addition, Griffin teaches "wherein the speech model parameters are generated by decoding a bit stream formed by a speech encoder" (col. 9, lines 26-30).

Regarding **claim 5**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 2). In addition, Griffin teaches "wherein the voicing information determines which frequency regions are voiced and which frequency regions are unvoiced" (col. 13, line 60 through col. 14, line 5).

Regarding **claim 6**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 5). In addition, Griffin in view of Barnwell (see rejection of claim 1) teaches "wherein the selected voicing state is the voiced voicing state and the pulse locations are computed such that the time between successive pulse locations is determined at least in part from the pitch information" (in particular, Barnwell, Fig. 5.2, the pitch period determines the space between the excitation pulses).

Regarding **claim 16**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 2). Barnwell teaches "wherein the selected voicing state is a

pulsed voicing state" (p. 88, Fig. 5.2, voiced excitation can be generated by a pulse generator in support of low bandwidth transmission, see claim 1 rejection).

Regarding **claim 27**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 1). In addition, Griffin teaches "wherein the spectral information includes a set of spectral magnitudes representing the speech spectrum at integer multiples of a fundamental frequency" (col. 4, lines 55-60).

Regarding **claim 28**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 1). In addition, Barnwell teaches "wherein the speech model parameters are generated by decoding a bit stream formed by a speech encoder" (col. 3, lines 4-22).

Regarding **claim 37**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 1). In addition, Griffin teaches "wherein the digital speech samples corresponding to the selected voicing state are further combined with other digital speech samples corresponding to other voicing states" (Fig. 2, col. 13, line 62 through col. 14, line 7).

Regarding **claim 38**, this claim has limitations similar to claim 1 and is rejected for the same reasons.

Regarding **claim 39**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 38). In addition, Griffin teaches "wherein the digital speech samples for the subframe corresponding to the selected voicing state are further combined with digital speech samples for the subframe representing other voicing states" (Fig. 2, col. 13, line 62 through col. 14, line 7).

Regarding **claim 40**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 39). In addition, Griffin teaches "wherein the voicing information includes one or more voicing decisions, with each voicing decision determining the voicing state of a frequency region in the subframe" (col. 13, line 62 through col. 14, line 7).

Regarding **claim 41**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 40). In addition, Griffin teaches "wherein each voicing decision determines whether a frequency region in the subframe is voiced or unvoiced" (col. 13, line 62 through col. 14, line 7).

Regarding **claim 43**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 41). In addition, Barnwell teaches "wherein each voicing decision further determines whether a frequency region in the subframe is pulsed" (Fig. 5.2 voicing selected the pulse generator that generates the appropriate frequency response when passed through the filter.

Regarding **claim 44**, Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 41). In addition, Griffin in view of Barnwell teach "wherein the selected voicing state is the voiced voicing state and the pulse locations depend at least in part on the decoded pitch information for the subframe" (Griffin, Fig. 2, decodes information resulting in V_k going to "voicing band determination" module; Barnwell, Fig. 5.2, pitch and voicing information go to pulse generator).

Regarding **claim 59**, this claim has limitations similar to claim 40 and is rejected for the same reasons.

Regarding **claim 60**, this claim has limitations similar to claim 41 and is rejected for the same reasons.

Regarding **claim 62**, this claim has limitations similar to claim 43 and is rejected for the same reasons.

Regarding **claim 63**, this claim has limitations similar to claim 44 and is rejected for the same reasons.

3. Claims 7, 42, 45, 46, 49, 61, 64, 65 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin in view of Barnwell and further in view of well known prior art (MPEP 2144.03).

Regarding **claims 7, 42, 45, 61 and 64** Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 6, 41, 60, 63, respectively), but Griffin in view of Barnwell does not specifically teach "the pulse locations are reinitialized if consecutive frames or subframes are predominately not voiced, and future determined pulse locations do not substantially depend on speech model parameters corresponding to frames or subframes prior to such reinitialization." However, the examiner takes official notice of the fact that reinitialization after a period of non-pulsed operation was well known in the art.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Griffin in view of Barnwell, because voiced operation is more accurate of the pulses are synchronized to the beginning of a voiced segment.

Regarding **claims 46, 49, 65 and 68** Griffin in view of Barnwell teaches everything claimed, as applied above (see claim 45, 43, 63, and 62, respectively), but Griffin in view of Barnwell does not specifically teach "the frequency responses of the first impulse response and the second impulse response correspond to the decoded spectral information in voiced frequency regions and the frequency responses are approximately zero in other frequency regions." However, the examiner takes official notice of the fact that a pulsed excitation will generate a frequency response and that the non-voiced segments will typically have a much lower energy response.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Griffin in view of Barnwell, because voiced operation is more accurate of the pulses are synchronized to the beginning of a voiced segment.

Allowable Subject Matter

(Assuming the 35 U.S.C. 101 rejections are overcome)

4. Claims 8-15, 17-26, 29-36, 47, 48, 50-58, 66, 67 and 69-77 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Note the 112 2nd rejections of claims 47, 48, 50-58, 66, 67 and 69-77 has precedence.

Regarding claims 10, 19, 31, 50 and 69, Griffin discloses the synthesis of MBE-based coded speech, but Griffin does not teach determining FFT coefficients from the decoded model parameters for the first frame in frequency regions where the voicing state equals the selected voicing state; processing the FFT coefficients with an inverse FFT to compute first time-scaled signal samples; interpolating and resampling the first time-scaled signal samples to produce first time-corrected signal samples; and multiplying the first time-corrected signal samples by a window function to produce the first digital filter. Thus the cited prior art alone or in combination, does not fairly suggest or disclose the claimed combination of features.

Regarding claims 8, 17 and 29, Griffin discloses method for reconstructing the spectral envelope and voicing information for each of a plurality of frames, but Griffin does not teach that the first digital filter is computed as the product of a periodic signal and a pitch-dependent window signal, and the period of the periodic signal is determined from the pitch information for the first frame. Thus the cited prior art alone or in combination, does not fairly suggest or disclose the claimed combination of features.

Regarding claims 25, 47 and 66, Griffin discloses method for synthesizing speech that includes the use of sinusoidal oscillators determined in part from the from the fundamental frequency, but Griffin does not teach that the pulse location corresponds to a time offset associated with an impulse in an impulse sequence, the first signal samples are computed by convolving the first digital filter with the impulse sequence, and the second signal samples are computed by convolving the second digital filter with the impulse sequence.

Citation of Pertinent Art

5. The following prior art made of record but not relied upon is considered pertinent to the applicant's disclosure:

- Barnwell et al. "Speech Coding: A Computer Laboratory Textbook" 1996, Wiley & Sons, Inc. pp.4-7.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to V. Paul Harper whose telephone number is (571) 272-7605. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

2/20/2007

VPH

V. PAUL HARPER
PRIMARY PATENT EXAMINER

V. Paul Harper